

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

Nationally Accredited with 'A' Grade by NAAC

ISO 9001:2015 Certified

TIRUCHIRAPPALLI

DEPARTMENT OF INFORMATION TECHNOLOGY



B.SC. INFORMATION TECHNOLOGY

SYLLABUS

2022 -2023 and Onwards

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

The department of Information Technology envisions to create technically competent, skilled intellectual IT professionals, efficient problem solvers, innovators and entrepreneurs to meet the current challenges of the modern computing industry.

MISSION

- To provide quality education and elevate the students towards higher educational Programs
- To encourage and guide the students to improve their competency skills in information technology market
- To equip the students to cater the industrial demands through providing advance training

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	LEARNING ENVIRONMENT To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	ACADEMIC EXCELLENCE To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	EMPLOYABILITY To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	GREEN SUSTAINABILITY To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES

FOR

B.Sc Computer Science, B.Sc Computer Science with

Cognitive Systems , BCA,

B.Sc Information Technology

PROGRAMMES

PO NO.	On completion of B. Sc Computer Science / B.Sc Computer Science with Cognitive Systems / BCA/ B.Sc Information Technology Programme, the students will be able to
PO1	ACADEMIC SKILLS & SOCIAL RESPONSIBILITY Apply Computing, Mathematical and Scientific Knowledge in Various disciplines by understanding the concerns of the society.
PO2	CRITICAL THINKING AND INNOVATIVE PROGRESS Design the software applications with varying intricacies using programming languages for innovative learning in techno world to meet the changing demands.
PO3	PERSONALITY DEVELOPMENT Perceive Leadership skills to accomplish a common goal with effective communication and understanding of professional, ethical, and social responsibilities.
PO4	LIFELONG LEARNING Identify resources for professional development and apply the skills and tools necessary for computing practice to gain real life experiences.
PO5	CREATIVITY AND HOLISTIC APPROACH Create a scientific temperament and novelties of ideas to support research and development in Computer Science to uphold scientific integrity and objectivity.

PROGRAMME SPECIFIC OUTCOMES
FOR
B.Sc INFORMATION TECHNOLOGY

PSO NO	Programme Specific Outcomes Students of B.Sc information Technology will be able to	POs Addressed
PSO1	To apply the knowledge of Science and Computing in Information Technology	PO1 PO5
PSO2	Analyze the local and global impact of computing on individuals, organizations, society and implant lifelong learning for professional development	PO2 PO4
PSO3	Improve the capability to apply the knowledge in interrelated domains and solve real world problems with modern technological tools	PO2 PO3
PSO4	To strengthen the academic quality, effective communication, good ethics and responsibilities during professional practice	PO4 PO5
PSO5	Excel in job oriented skills which are required to meet the current demand in the field of IT industry and to become an entrepreneur with confidence	PO2 PO3



Cauvery College for Women (Autonomous), Trichy

B.Sc Information Technology

(For the candidates admitted from the Academic year 2022-2023 and onwards)

Semester	Part	Course	Title	Course Code	Inst. Hrs.	Credits	Exam			Total
							Hrs.	Marks		
								Int.	Ext.	
I	I	Language Course-I(LC)	Ikkala Ilakiyam	22ULT1	6	3	3	25	75	100
			Hindi Literature & Grammar - 1	22ULH1						
			History of popular tales, Literature and Sanskrit story	22ULS1						
			Basic French – I	22ULF1						
	II	English Language Course-I(ELC)	Functional English for Effective Communication –I	22UE1	6	3	3	25	75	100
	III	Core Course – I(CC)	Programming in C	22UIT1CC1	5	5	3	25	75	100
		Core Practical - I (CP)	Programming in C Practical	22UIT1CC1P	3	3	3	40	60	100
		First Allied I	Essential Mathematics	22UIT1AC1	4	3	3	25	75	100
		First Allied II	Numerical Analysis and Statistics	22UIT1AC2	4	3	3	25	75	100
	IV	Ability Enhancement Compulsory Course-I (AECC)	UGC Jeevan Kaushal- Universal Human Values	22UGVE	2	2	-	100	-	100
	Total				30	22				700

Semester I	Internal Marks: 25		External Marks : 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs./Week	CREDITS
22UCS1CC1/ 22UCA1CC1/ 22UIT1CC1	PROGRAMMING IN C	CORE	5	5

Course Objectives

- To understand the basics of C language
- To get the deep knowledge of programming using C language
- To develop logics which will help them to create programs and applications in C.
- Enhance skill on problem solving by constructing algorithms

Course Outcomes and Cognitive Level Mapping

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Define the basic concepts of C Programming	K1
CO2	Illustrate the components of C programming	K2
CO3	Build algorithms and data structures swiftly and faster computation using programs	K3
CO4	Apply the knowledge of programming concepts to develop programs	K4
CO5	Solve real time problems using C	K5

Mapping of CO with PO and PSO

COs\ PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	2	2	2	2	3	2
CO2	3	2	3	2	3	3	3	2	3	2
CO3	3	3	3	2	3	3	3	2	3	3
CO4	3	2	3	2	3	2	2	2	3	3
CO5	3	3	3	2	3	3	3	2	2	3

“1” – Slight (Low) Correlation
“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation
“-” indicates there is no correlation.

Syllabus

UNIT I

(15 Hours)

Developing a program in C: Algorithm-Pseudocode-Flowchart- Planning a C program- Writing a C program- Compile and Run a C Program-**Overview of C:** – Structure of C program – Character set- Tokens – Data types – Variables – Declaration of variables – Symbolic constant – Operators and Expressions

UNIT II

(15 Hours)

Managing Input and Output Operations: Reading and Writing a character -Formatted Input and Output. **Decision Making and Branching:** If, Switch, The ? : operator - The GoTo Instruction – **Decision Making and Looping:** Introduction – While, DO, For Statements – Jumps in Loops.

UNIT III

(15 Hours)

Array – One dimensional array – Two and multidimensional array – Character array – String functions – **User-Defined Functions:** Need for User -Defined Functions –A Multi-Function Program- Elements of User-Defined Functions-Definition of Functions –Return values and Their Types-Function Calls- Function Declaration- Category of Functions – Nesting of Functions - Recursion - Storage Class- The scope and lifetime of variables in functions.

UNIT IV

(15 Hours)

Structures and Unions: Structure definition – Structure Initialization – Array of structure – Array within structure –Structure within Structure-Union– **Pointers:** Understanding pointers - Accessing the address of a variable - Declaring and Initializing pointers - Accessing a variable through its pointers - Pointer Expressions - Pointers and Arrays - Pointers and Character strings.

UNIT V

(15 Hours)

File Management: Defining and Opening File –Closing a File – I/O operations on Files – Error handling during I/O operations – Random Access to Files- Command Line Arguments.

UNIT VI - Self Study for Enrichment

(Not to be included for External Examination)

Develop algorithms for real time scenario - Area calculations, Conversion programs, swapping numbers (with and without using temporary variable). Programs for checking eligibility, Triangle formation, Sum of numbers, Sum of series, Array manipulations (Sorting, searching, insert, delete and merging), String handling programs, Dynamic memory management using pointers, Employee pay bill preparation using Files.

Text Books

1. Byron Gottfried. (2018). Programming with C, 4th Edition, Tata McGraw Hill.(Unit – I)
2. Balagurusamy.E. (2017). Programming in ANSI C, 7thEdition, Mc Graw Hill Education, New Delhi. (Unit I –V)

Reference Books

1. Yashavant Kanetkar. (2020). Let Us C. 16th Edition, BPB Publications, New Delhi.
2. Ashok N. Kamthane, Amit Ashok Kamthane. (2015). Programming in C. 3rd Edition, Pearson India Education Services Pvt. Ltd.

Web References

1. <https://www.learn-c.org/>
2. <https://www.cprogramming.com/>
3. <https://www.tutorialspoint.com/cprogramming/index.htm>

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designers

1. Dr.M.Anandhi
2. Ms.R.Sridevi

Semester – I	PROGRAMMING IN C PRACTICALS	Hours/Week-3	
Core Practical – I(CP)		Credits - 3	
Course Code 22UIT1CC1P		Internal-40	External-60

Objectives:

- To develop and execute C programs
- To apply the knowledge of control structures, Arrays and functions
- To enhance logical ability and problem solving skills

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	Recall program execution and Debugging	K1 to K2
CO2	Demonstrate the ideas of control structures	K1 to K3
CO3	Make use of functions, arrays, apply string handling functions and develop files	K1 to K3
CO4	Develops the ability to analyse a problem and implement an algorithm to solve it.	K2 to K4
CO5	Acquire logical thinking, Identify the correct and efficient ways of solving problems	K2 to K5

Mapping with Programme Outcomes

COs\ POs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2	2	3	1	2	3
CO2	3	2	3	2	3	3	2	2	2	3
CO3	3	2	2	2	2	3	3	2	3	2
CO4	3	3	2	3	2	3	3	2	3	3
CO5	3	3	3	2	3	3	3	3	2	3

Syllabus

1. Simple Programs
2. Control Structures – Branching statements
3. Control structures – Looping statements
4. Array Manipulations
5. Handling Strings
6. Implementation of functions
7. Applications of Pointers
8. Structures and Files
9. Programs using Graphics functions
10. Simple game programs
11. Special programs
 - Ring a bell
 - Printing patterns
 - String tokenizer
 - Use Sleep function

FIRST ALLIED COURSE –I (AC)**ESSENTIAL MATHEMATICS**

(For B.Sc Computer Science , B.Sc Information Technology & BCA)

(2022-2023 and Onwards)

Semester I	Internal Marks:25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UCS1AC1/ 22UCA1AC1/ 22UIT1AC1	ESSENTIAL MATHEMATICS	ALLIED	4	3

Course Objective

- **Apply** the basic concepts of Differentiation, Integration and their applications.
- **Compute** mathematical quantities using ordinary and partial differential equations.
- **Explore** fundamental concepts in graph theory.

Course Outcomes**Course Outcome and Cognitive Level Mapping**

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Remember and recall the basic concept of essential mathematics.	K1
CO2	Illustrate the various notions in the respective streams .	K2
CO3	Apply the different terminologies of essential mathematics.	K3
CO4	Classify the solution of mathematical problems using various techniques.	K4
CO5	Examine the solution of mathematical problems.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	2
CO3	3	2	3	3	3	3	3	3	2	2
CO4	3	2	2	3	3	3	3	3	3	2
CO5	3	2	3	3	3	3	3	3	2	2

“1” – Slight (Low) Correlation – “2” – Moderate (Medium) Correlation –

“3” – Substantial (High) Correlation – “-” indicates there is no correlation.

Syllabus

UNIT I

(12 HOURS)

Matrices:

Matrix – Special types of matrices – Scalar multiplication of a matrix – Equality of matrices – Addition of matrices – Subtraction – Multiplication of Matrices – Inverse matrix – Relation between adjoint and inverse matrices – Solution of simultaneous equations – Rank of a matrix – A system of m homogeneous linear equations in n unknowns – System of non-homogeneous linear equations – Eigen values and Eigenvectors – Similar matrices – Cayley-Hamilton Theorem (proof not needed) – Simple applications only.

UNIT II

(12 HOURS)

Differentiation:

Maxima and Minima (Problems Only) – Points of inflexion.

Partial differentiation:

Functions of function rule – Total Differential Coefficient – A Special case – Implicit Functions – Homogeneous functions – Euler's Theorem (proof not needed) – Simple problems only.

UNIT III

(12 HOURS)

Integration:

Integration of Rational algebraic functions – Rule (a) – Rule (b): Type i: $\int \frac{dx}{ax^2+bx+c}$, Type ii: $\int \frac{lx+m}{ax^2+bx+c} dx$ – Integration of Irrational functions : Case (ii) Integration of the form $\int \frac{px+q}{\sqrt{ax^2+bx+c}}$ – Type $\int \frac{dx}{a+b\cos x}$ – Properties of definite integrals.

UNIT IV

(12 HOURS)

Differential Equations:

Linear Differential Equation with constant coefficients – The Operators D and D^{-1} – Particular Integral – Special methods of finding P.I.: X is of the form (a) $e^{\alpha x}$ (b) $\cos \alpha x$ or $\sin \alpha x$, where α is a constant (c) x^m (a power of x), m being a positive integer (d) $e^{\alpha x}V$, where V is any function of x .

UNIT V

(12 HOURS)

Graph Theory:

Introduction – Definition of Graphs – Applications of Graphs – Finite and infinite graphs – Incidence and Degree – Isolated Vertex, Pendant Vertex, and Null Graph.

Path and Circuits:

Isomorphism – Subgraphs – Walks, Paths, and Circuits – Connected Graphs, Disconnected Graphs, and Components – Euler graphs.

UNIT VI Self-Study for Enrichment: (Not to be included for External Examination)

Symmetric matrix – Skew symmetric matrix – Hermitian and skew Hermitian matrices
Concavity and Convexity– Integration by parts – Linear equation – Hamiltonian Paths and Circuits.

Text Books

1. T.K.Manicavachagom Pillay, T.Natarajan, K.S.Ganapathy.(2015). *Algebra, Volume II*
S. Viswanathan (Printers & Publishers) Pvt., Ltd.
2. S.Narayanan, T.K.Manicavachagom Pillay.(2015). *Calculus, Volume I*.
S. Viswanathan (Printers & Publishers) Pvt., Ltd.
3. S.Narayanan, T.K.Manicavachagom Pillay.(2015). *Calculus, Volume II*.
S. Viswanathan (Printers & Publishers) Pvt., Ltd.
4. S.Narayanan, T.K.Manicavachagom Pillay.(2015). *Calculus, Volume III*.
S. Viswanathan (Printers & Publishers) Pvt., Ltd.
5. Narsingh Deo. (2003). *Graph Theory with applications to Engineering and Computer*.
Prentice Hall of India Private Limited

UNIT-I Chapter 2: Section 1 to 5, 7, 8, 10 to 16[1]

UNIT-II Chapter V: Section 1.1 to 1.5[2]
Chapter VIII: Section 1.2 to 1.6[2]

UNIT-III Chapter 1: Section 7.1 to 7.3, 8 (CASE II), 9, 11[3]

UNIT-IV Chapter 2: Section 1 to 4[4]

UNIT-V Chapter 1: Section 1.1 to 1.5[5]
Chapter 2: Section 2.1, 2.2, 2.4 to 2.6[5]

Reference Books

1. A.Singaravelu. (2003). *Allied Mathematics*. A.R.Publications
2. P.R.Vittal. (2014). *Allied Mathematics*. Margham Publications, Chennai.
3. S.Arumugam and S.Ramachandran.(2006). *Invitation to Graph Theory*. Sci Tech
Publications (India) Pvt Ltd., Chennai

Weblinks

1. <https://youtu.be/rowWM-MijXU>
2. <https://youtu.be/TQvxWaQnrqI>
3. <https://youtu.be/pvLj1s7SOtk>

4. https://youtu.be/Gxr3AT4NY_Q
5. <https://youtu.be/xlbbeYbYLzg>
6. <https://youtu.be/b0RJkIBhfEM>
7. <https://youtu.be/s5KZw1EpBEo>

Pedagogy

Assignment, Seminar, Lecture, Quiz, Group discussion, Brain storming, e-content.

Course Designers

1. Dr. V. Geetha
2. Dr. S. Sasikala

FIRST ALLIED COURSE-II (AC)
NUMERICAL ANALYSIS AND STATISTICS

(For B.Sc Computer Science , B.Sc Information Technology & BCA)

(2022-2023 and Onwards)

Semester I	Internal Marks: 25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS
22UCS1AC2/ 22UCA1AC2/ 22UIT1AC2	NUMERICAL ANALYSIS AND STATISTICS	ALLIED	4	3

Course Objective

- **Understand** the implementation of various methods of Numerical Analysis.
- **Organize** and **summarize** the statistical data.
- **Analyze** and **evaluate** the strengths of the conclusions based on data.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Understand the list of basic ideas of Numerical Methods and Statistics.	K1,K2
CO2	Solve the problems using various methods and also classify the given datas.	K2,K3
CO3	Identify the conceptual collection and classification of variables.	K3
CO4	Analyze the accuracy and graphical representation of statistical datas.	K4
CO5	Support the implementation of numerical methods and statistical datas.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	3	3	2	3	2
CO2	3	3	2	2	2	3	2	3	2	3
CO3	2	3	3	2	2	2	3	3	2	3
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	2	3	3	3	2	2	3	3

“1” – Slight (Low) Correlation – “2” – Moderate (Medium) Correlation –

“3” – Substantial (High) Correlation – “-” indicates there is no correlation.

Syllabus

UNIT I

(12 HOURS)

Solution of Algebraic & Transcendental Equations:

Introduction – The Bisection Method – The Iteration Method – Newton-Raphson Method (Problems Only)

Interpolation:

Finite Differences: Forward Differences, Backward Differences – Newton’s Formulae for Interpolation – Interpolation with unevenly spaced Points: Lagrange’s Interpolation formula

UNIT II

(12 HOURS)

Numerical Integration:

Numerical Integration: Simpson’s 1/3-Rule – Simpson’s 3/8-Rule (proof not needed).

Linear Systems of Equations:

Solution of Linear Systems–Direct Methods: Gaussian Elimination Method – Solutions of Linear Systems – Iterative Methods (Problems Only)

UNIT III

(12 HOURS)

Numerical solution of Ordinary Differential Equations:

Introduction – Euler’s Method – Modified Euler’s Method – Runge-Kutta Methods – Predictor - Corrector Methods : Adams-Moulton Method

UNIT IV

(12 HOURS)

Measures of Central Tendency:

Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean.

Measures of Dispersion:

Mean Deviation – Standard Deviation (Simple Problems Only)

UNIT V

(12 HOURS)

Correlation:

Introduction – Meaning of Correlation – Scatter Diagram – Karl Pearson's co-efficient of Correlation – Rank Correlation: Spearman's Rank Correlation Coefficient (Derivation not needed and Simple Problems Only).

Linear Regression:

Introduction – Linear Regression (Derivation not needed and Simple Problems Only)

UNIT VI Self-study for Enrichment (Not to be included for External examination)

The method of False Position & Central Differences - Trapezoidal rule - Solution by Taylor's Series and Milne's Method - Range – Quartile Deviation - Rank Correlation (Repeated Ranks).

Text Books

1. Sastry S. S. (1998). Introductory methods of Numerical Analysis, Third Edition. Prentice Hall of India Private Limited.
2. Gupta. S.C & Kapoor, V.K (2007). Fundamentals of Mathematical Statistics. Sultan Chand & sons, New Delhi.

UNIT – I Chapter 2: Sections 2.1 - 2.3(Omit 2.3.1), 2.5(Omit 2.5.1) [1]

Chapter 3: Sections 3.3 (Omit 3.3.4), 3.6, 3.9(3.9.1 only) [1]

UNIT – II Chapter 5: Sections 5.4(5.4.2 & 5.4.3 only) [1]

Chapter 6: Sections 6.3(6.3.2 only) & 6.4 [1]

UNIT – III Chapter 7: Sections 7.1, 7.4- 7.6 (Omit 7.4.1 & 7.6.2) [1]

UNIT – IV Chapter 2: Sections 2.5 - 2.9, 2.13 (Omit 2.13.1 & 2.13.2) [2]

UNIT –V Chapter 10: Sections 10.1 - 10.4, 10.7(10.7.1 Only) [2]

Chapter 11: Sections 11.1 & 11.2 [2]

Reference Books

1. Jain M. K, Iyengar S. R.K. and Jain R.K. (1999). Numerical Analysis Numerical Methods for Scientific and Engineering Computations. New Age International Private Limited.
2. Froberg C.E. (1979). Introduction to Numerical Analysis. II Edition. Addison Wesley

Web Links

1. <https://youtu.be/qCzUXav5Nk>
2. <https://youtu.be/r6MTvrI8SQ4>
3. <https://youtu.be/s05dONL4xAs>

4. <https://youtu.be/XaHFNhHfXwQ>
5. <https://youtu.be/zPG4NjIkCjc>

Pedagogy

Power point presentations, Group Discussions, Seminar, Quiz, Assignment.

Course Designers

1. Dr.R.Buvaneswari
2. Ms.A.Gowri Shankari